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2011 Special Reliability Assessment: A Primer on the Natural Gas and Electric Power Interdependency in the United States

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Timeline

Phase I

Sept 13-14	Report sent to PC for review and comment
October 25	Report to be considered for approval by PC
November 18	Report to be considered for approval by BOT
Mid November	Publish Report

Phase II

- Under development
- Comments on the study design/scope received from PC
- Expected during Q1, 2012

Highlights

- Key differences exists between gas and electricity producers; regional differences also exist
- Increased coordination and communication is needed
- Nearby gas storage and dual-fuel switching options diminish interdependency issues
- Electric loads present unique challenges to gas pipeline operators
- Future expansion of pipelines to accommodate electric sector growth

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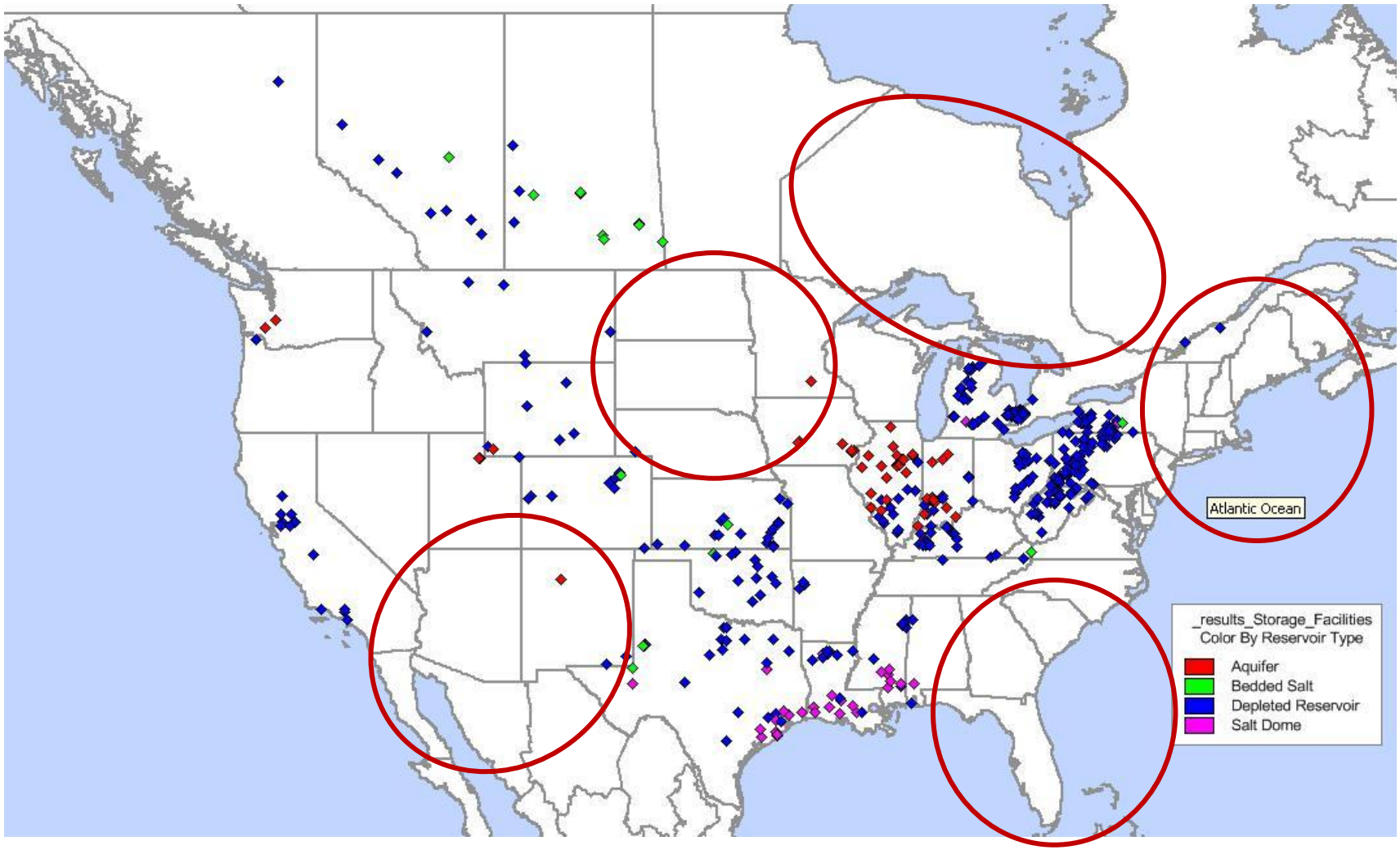
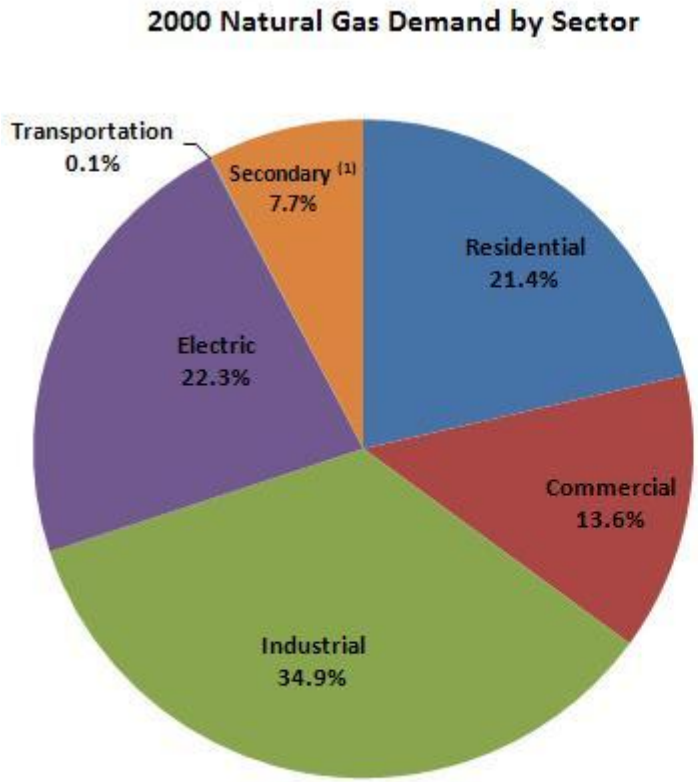
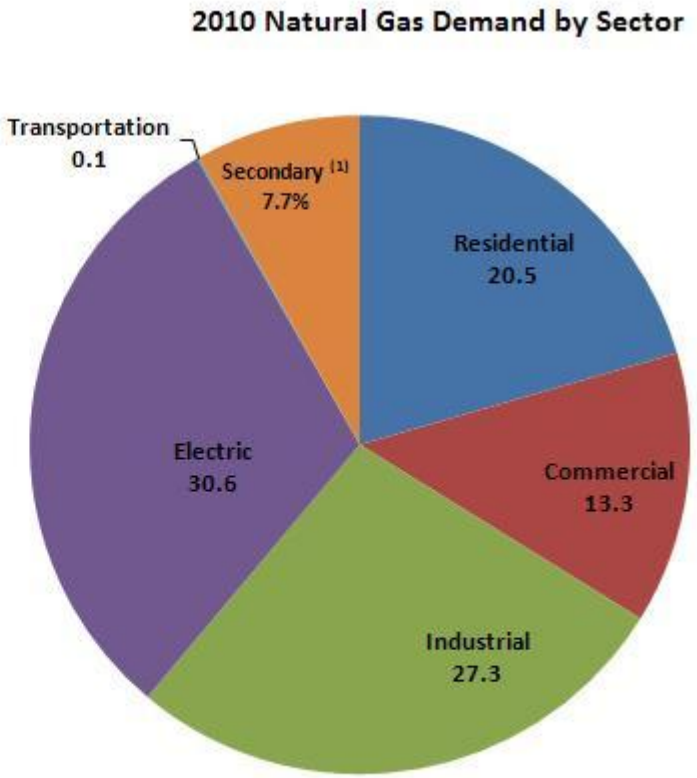
Gas Storage in North America



Gas Demand Growth by Sector



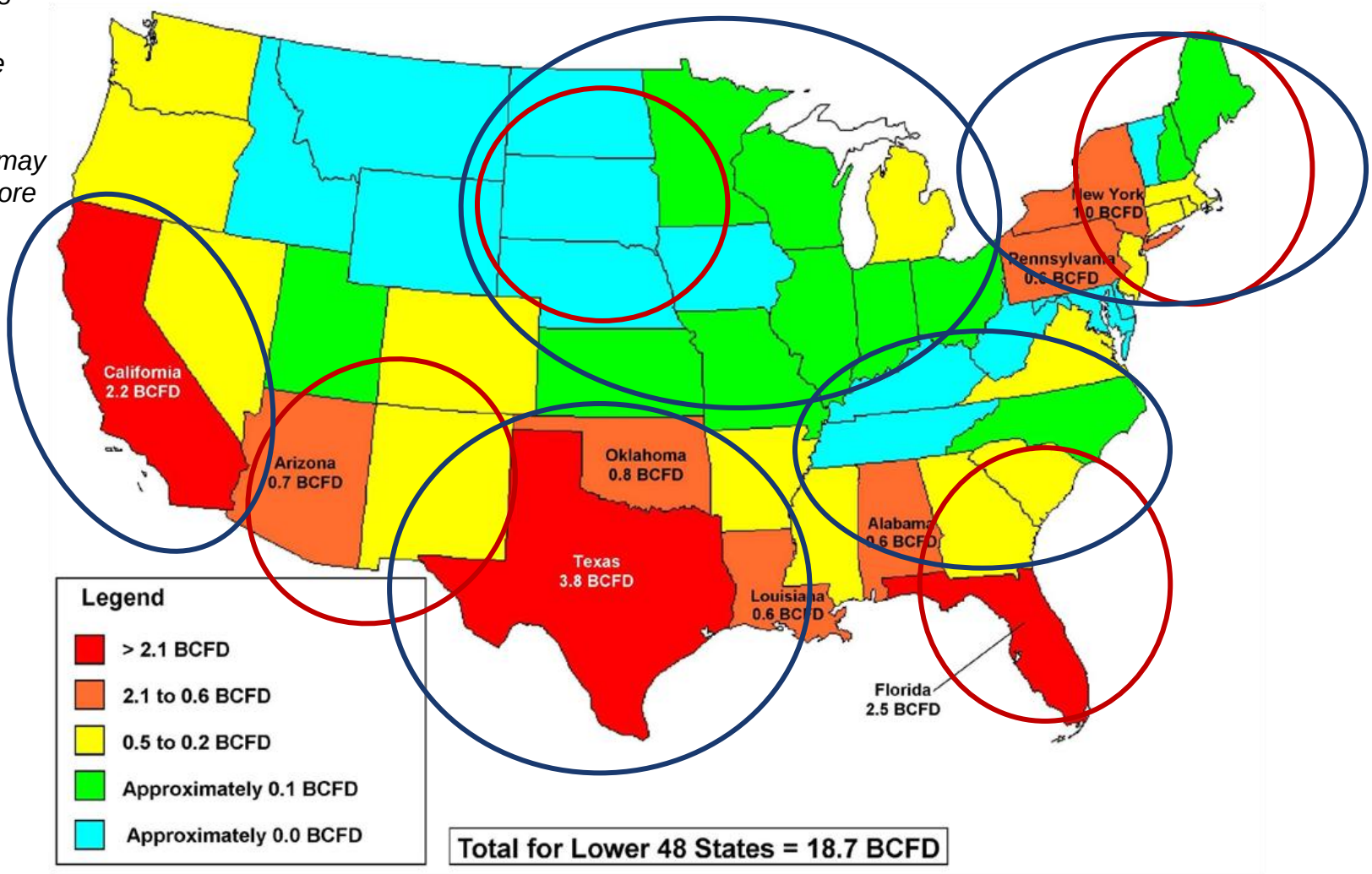


1. Secondary Demand includes Lease and Plant Fuel, and Pipeline Fuel

Source: EIA

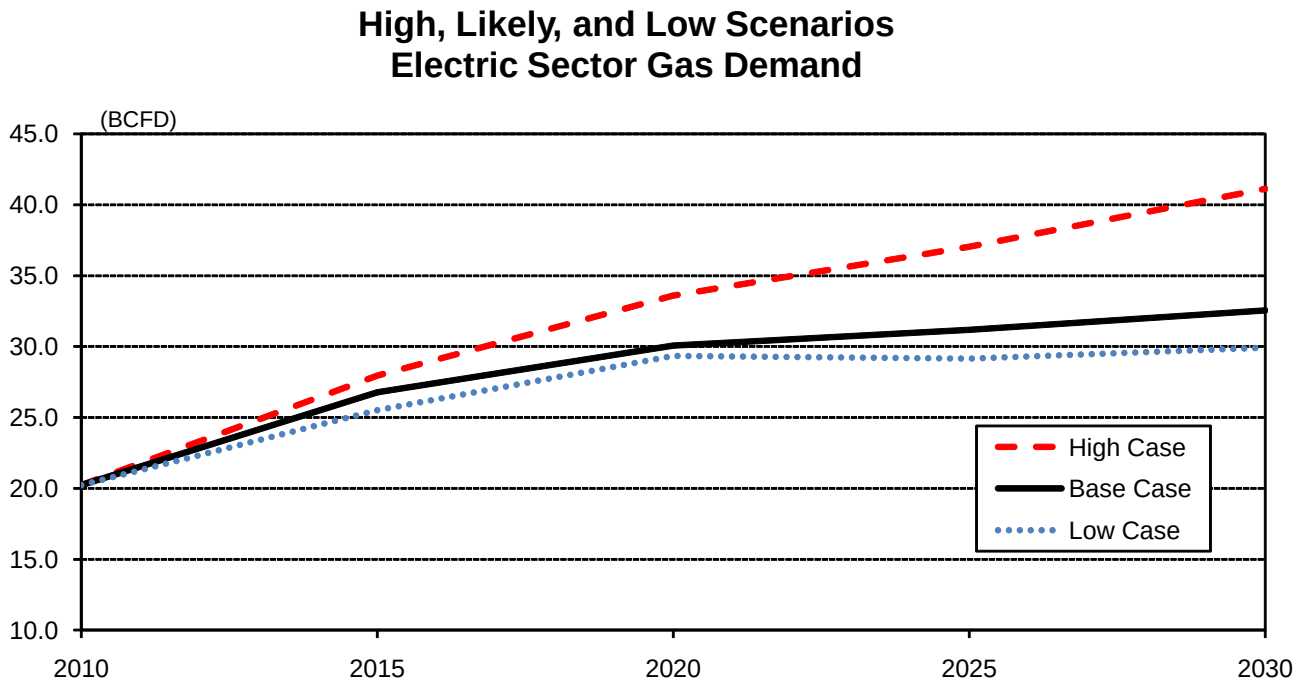
2010 US Gas Consumption

- *Areas of no gas storage*
- *Areas where significant potential retirements may occure → more gas-fired generation expected*



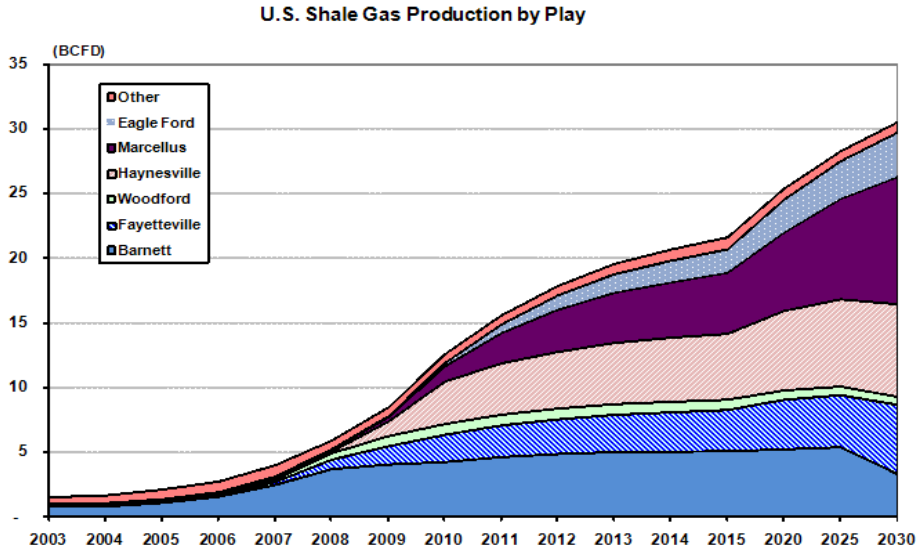
What We'll Need

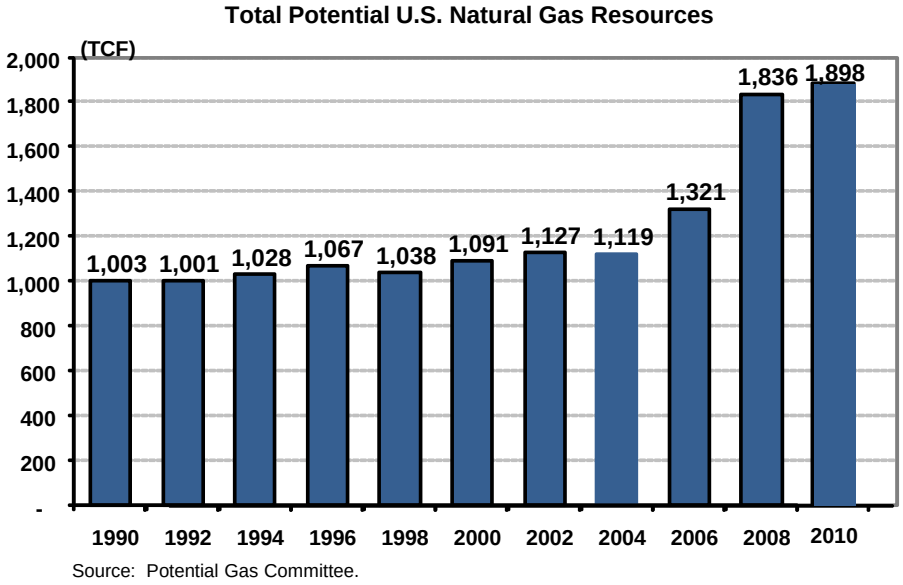
- Demand projected to increase by 55 to 65 percent by 2020; and potentially more than double by 2030



What We Have

- Over 100 years of potential shale gas at current rates
- Uncertainty in environmental regulations will affect gas prices





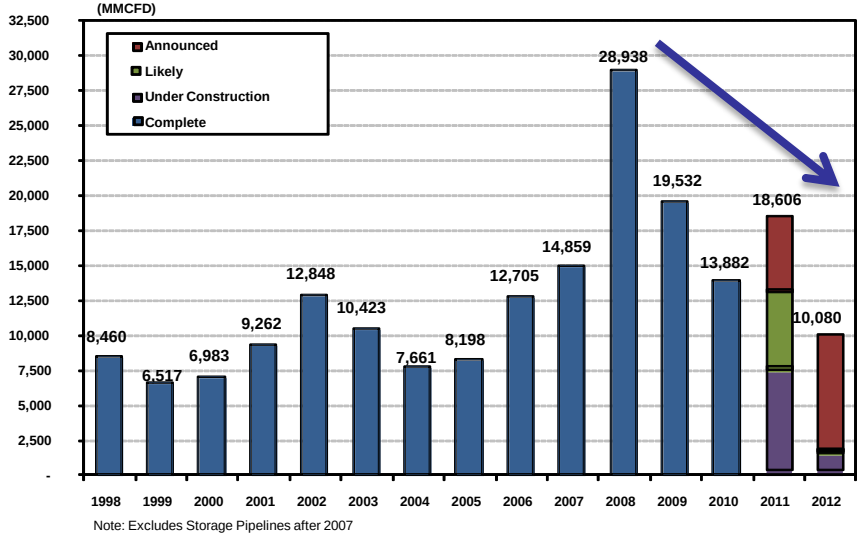
Source: Potential Gas Committee.

How We'll Get it There

- 8.3 BCFD of gas pipeline capacity built in last 10 years
- 24k miles of gas pipeline built in last 10 years

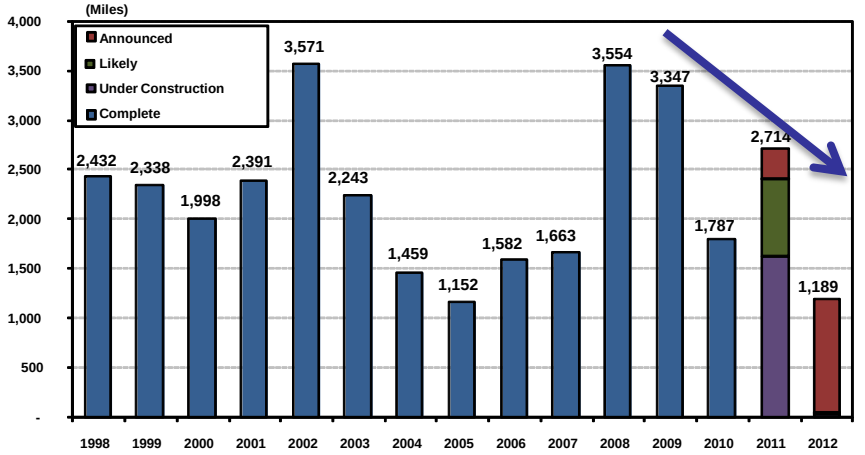
  Reference: Electric industry took 17 years to build 24k circuit miles of transmission greater than 200 kV
- More pipeline capacity will be needed to support new gas-fired capacity

Natural Gas Pipeline Capacity Additions



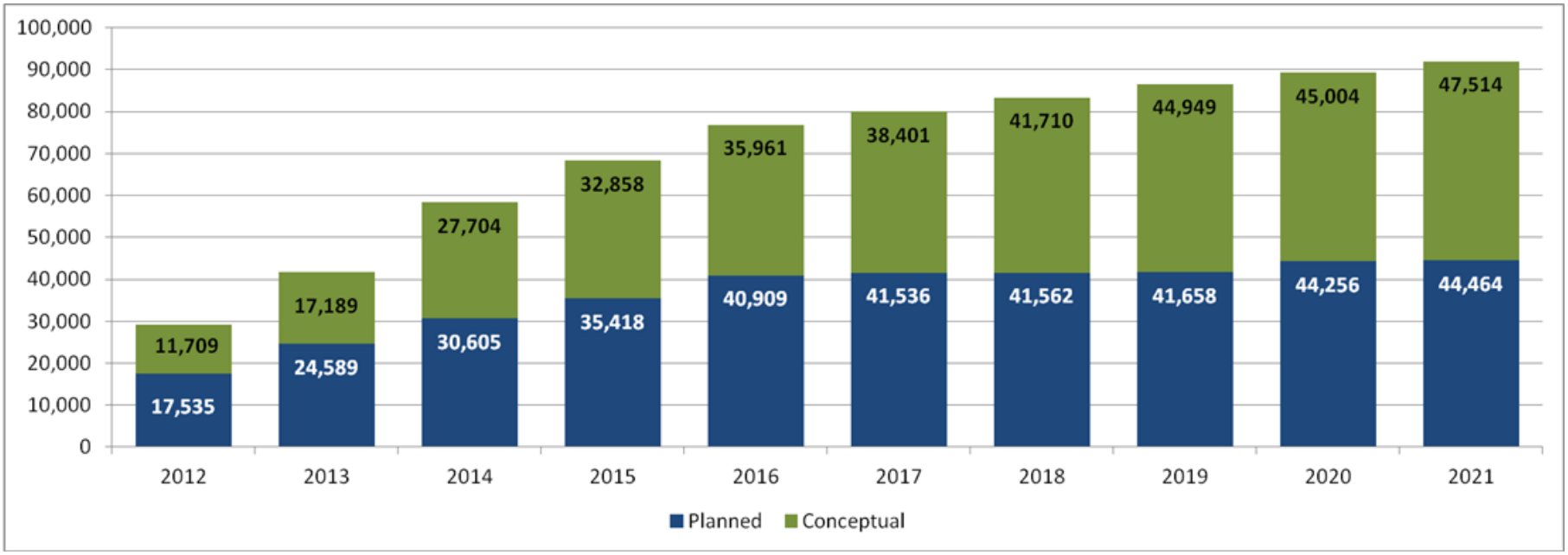
Note: Excludes Storage Pipelines after 2007

Natural Gas Pipeline Mileage Additions



How Much Gas-Fired Capacity Are We Expecting?

- As provided in the 2011 Long-Term Reliability Assessment:
  - Approximately 45 GW of Planned; 48 GW of Conceptual
  - More expected due to not yet announced retirements of coal-fired gen.



Do the Math…

- **Assuming**: For every 1 MW of coal-fired generation replaced with gas-fired generation (baseload; running 24 hours a day), approximately 0.168 MMCFD of gas supply is needed.
- **Assuming:** The most recent five-year average pipeline capacity/mile is 7 MMCFD/mile
- 24,000 miles of additional gas pipeline may be needed for about 50 GW of displaced coal-fired generation
  - This is the same amount of miles built in the past 10 years

Need Closer Coordination and Enhanced Communication

- Gas-Day vs. Electric Day
  - Long-standing issue between the two industries
  - Both sides have “dealt” with it, and aware of the potential issues
  - Increasing concerns and challenges loom

Status of 2004 Recommendations

- Update since 2004 Study
  - Significant progress has been made
  - Recommendations for Reliability Assessment are implemented and continuing
  - Coordination between pipeline operators and electric system operators is closer
    - Identifying pipeline outages that can affect reliability
    - More needed on planning front
      - Firm contracts vs. pipeline expansion
  - Many recommendations related to a “tracking” system
    - Not formal in NERC process, but liaison activities between stakeholders and gas associations in place

Recommendations

- Natural gas storage expansion to meet unique electric sector demand characteristics (i.e., unexpected swings)
- Vital information needs to be shared with system operators from both industries.
- Communication between industries is essential
- Vulnerabilities should be identified and mitigating strategies implemented by both industries (i.e., coordinated action)

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Questions?

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